

REMARKS

By the above amendment, claim 4 has been amended to incorporate a portion of the features of dependent claim 5 therein, with claim 5 being canceled, and claim 4 also being amended to clarify features. Additionally, claims 7 and 9 have been amended and new dependent claims 10 - 13 have been presented which recite further features of the present invention, it being noted that claim 7 has been amended to depend from new dependent claim 10.

At the outset, applicants note that the present invention is directed to a magnetic recording and reading device having a data transfer rate of more than 50 MB/s and a recording density of more than 5 Gb/in², utilizing a magnetic head having a resistivity of more than 50 $\mu\Omega$ cm with a particular construction of the magnetic layer of the magnetic recording medium so as to enable achievement of the data transfer rate and recording density as set forth in claim 4 and the dependent claims thereof. The present invention as recited in claim 4 is directed to a magnetic recording and reading device having a transfer rate of not less than 50 MB/s and a recording density of more than 5 Gb/in², in which a magnetic head has a resistivity of more than 50 $\mu\Omega$ cm and a magnetic core length of not more than 35 μ m, and a magnetic layer of a magnetic recording medium contains (1) at least one metal element selected from a first group consisting of Co, Fe and Ni as a primary component, (2) at least two elements selected from a second group consisting of Cr, Mo, W, V, Nb, Ta, Ti, Zr, Hf, Pd, Pt, Rh, Ir and Si, and (3) at least one metal element selected from a third group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Td, Dy, Ho, Er, Tm, Yb, Lu, Bi, Sb, Pb, Sn, Ge and B, with the at least one element selected from the third group being in an amount of 0.1 to 15 atomic %.

As described in the specification at page 5, line 24 to page 6, line 19 of the specification, for example, the present inventors made a full consideration of a high-speed rotating recording medium having a high data transfer rate. As a result they found a problem that in the case where magnetic recording at a high frequency of not less than 50 MB/s is made on a conventional magnetic recording medium for low noise applications, data can not be correctly recorded on the magnetic recording medium. Another finding is that in the case where magnetic recording is conducted by means of a recording head with a large electric current, undesirably the magnetic recording field becomes broader. Further, the invention found flux reversal delays when data-recording whereby there occurs recording-failure on some storing-bits of the conventional magnetic recording medium, in the case of recording at a high frequency of more than 50 MB/s, even though no such problem occurs when recording at a frequency level of 20 MB/s, for example.

The present inventors found that in order to realize a magnetic recording and reading device having a transfer rate of not less than 50 MB/s and a recording density of more than 5 Gb/in², it is necessary to identify specific relationships among a recording head, a magnetic recording medium, and other components of the device. Under such recognition, in order to realize high frequency magnetic recording and reproduction of a transfer rate of not less than 50 MB/s and a recording density of more than 5 Gb/in², the inventors determined the requirements for a combination of a magnetic recording/reading head being capable of generating a strong magnetic field at a high rate in response to fast driving current, as described at page 10, line 25 to page 11, line 1 of the specification, for example, and a magnetic recording medium by which it is possible to optimize thermal fluctuations of magnetization and spin damping, as described at page 12, line 14 to page 12, line

24 of the specification, for example. Thus the present inventors determined the features which provide a sufficient magnetic field even in the case of a transfer rate of more than 50 MB/s, and to realize a recording medium having a recording density exceeding 5 Gb/in² because of an improved frequency responsibility in recording characteristics of the magnetic recording medium so as to provide the features as now recited in claim 4 and the dependent claims.

As to the rejection of claims 4, 7 and 9 under 35 USC 103(a) as being unpatentable over Crue et al (US 6,043,959) in view of Oka (US 5,494,722) and Han et al (US 6,024,886); the rejection of claim 5 under 35 USC 103(a) as being unpatentable over Crue et al in view of Oka et al and Han further in view of Tagawa (US 6,022,555) and Shiraishi et al (US 5,995,329); the rejection of claim 6 under 35 USC 103(a) as being unpatentable over Crue et al in view of Oka et al and Han further in view of Linliu et al (US 5,773,199); and the rejection of claim 8 under 35 USC 103(a) as being unpatentable over Crue et al in view of Oka et al and Han, further in view of Hayashi (US 6,090,480); such rejections are traversed insofar as they are applicable to the present claims and reconsideration and withdrawal of the rejections are respectfully requested.

As to the requirements to support a rejection under 35 USC 103, reference is made to the decision of In re Fine, 5 USPQ 2d 1596 (Fed. Cir. 1988), wherein the court pointed out that the PTO has the burden under '103 to establish a prima facie case of obviousness and can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. As noted by the court, whether a particular combination might be "obvious to try" is not a legitimate test of patentability and obviousness cannot be

established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. As further noted by the court, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

Furthermore, such requirements have been clarified in the decision of In re Lee, 61 USPQ 2d 1430 (Fed. Cir. 2002) wherein the court in reversing an obviousness rejection indicated that deficiencies of the cited references cannot be remedied with conclusions about what is "basic knowledge" or "common knowledge".

The court pointed out:

The Examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question of motivation is immaterial to patentability, and could not be resolved on subjected belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." Thus, the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion. (emphasis added)

Turning to independent claim 4 as now recited in such claim, a magnetic recording and reading device has a data transfer rate of more than 50 MB/s and a recording density of more than 5Gb/in², and comprises a particular combination of features so as to enable achieving the data transfer rate and recording density as set forth. That is, the combination of features include a magnetic recording medium having a substrate and a magnetic layer formed on the substrate, a magnetic head

including a recording head with a magnetic core having a core length l_1 of not more than $35\mu\text{m}$ and having a resistivity of more than $50\mu\Omega\text{cm}$, and a read heading with a track element of not more than $0.9\mu\text{m}$, and a R/W-Ic. With regard to the magnetic recording medium, a particular combination of features of the magnetic layer thereof is set forth in which the magnetic layer contains (1) at least one metal element selected from a first group consisting of Co, Fe and Ni as a primary component, (2) at least two elements selected from a second group consisting of Cr, Mo, W, V, Nb, Ta, Ti, Zr, Hf, Pd, Pt, Rh, Ir and Si, and (3) at least one element selected from a third group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Td, Dy, Ho, Er, Tm, Yb, Lu, Bi, Sb, Pb, Sn, Ge and B, wherein the at least one element selected from the third group is an amount of 0.1 to 15% atomic percent. With these features, applicants have achieved a magnetic recording and reading device with the data transfer rate of more than 50MB/s and a recording density of more than 5Gb/in^2 , which features are recited in independent claim 4 and the dependent claims thereof, and which combination of features are not disclosed or taught in the cited art in the sense of 35 USC 103 as will be discussed below.

At the outset, applicants submit that the Examiner has engaged in an impermissible hindsight reconstruction attempt of the present invention, picking bits and pieces from the prior art in an attempt to reconstruct the present invention utilizing the principle of "obvious to try" which is not the standard of 35 USC 103. See, In re Fine, supra.

Turning to the combination of Crue et al, Oka and Han et al, the Examiner cites Crue et al as showing a magnetic head for writing data at a high areal density. However, Crue et al provides no disclosure or teaching concerning the necessity for a magnetic recording medium of a particular structure nor the structure of the

magnetic head as having a recording head with a magnetic core of a magnetic core length l_1 of not more than $35\text{ }\mu\text{m}$ and having a resistivity of more than $50\mu\Omega\text{cm}$ together with a reading head provided with a read element having a track width of not more than $0.9\mu\text{m}$. Additionally, Crue et al does not disclose a R/W-IC as part of a magnetic recording and reading device. As such, it is apparent that while Crue et al may suggest individual features of a magnetic head which is alleged to provide a high data transfer rate and high recording density, Crue et al provides no disclosure of a magnetic head, as claimed, and the interrelationship with other elements including a magnetic recording medium having specific features, a R/W-IC so as to enable a magnetic recording and reading device operating in accordance with the recited features. Thus, applicants submit that all claims patentably distinguish over Crue et al in the sense of 35 USC 103.

The Examiner recognizing the deficiencies of Crue et al contends that Oka et al discloses a magnetic recording medium having low signal to noise ratio and suggests that one of ordinary skill in the art would have been motivated to combine these two together to form a magnetic recording and reading device for working at high areal densities. Applicants submit that the Examiner has engaged in a hindsight reconstruction attempt in that Crue et al and Oka et al fail to consider a problem to be solved in the case of recording at a high frequency of not less than 50MB/s , flux reversal delays when data-recording such that recording failure occurs on some storing-bits of a conventional recording medium, and such references are silent that in order to realize a magnetic recording and reproducing device having a data transfer rate of more than 50MB/s and a recording density of more than 5 GB/in^2 , an improvement is needed for both the magnetic recording head and a magnetic recording medium so that they cooperate together to provide the desired operational

features, and applicants submit that neither Crue et al or Oka et al disclose or teach the recited features of claim 4 and the dependent claims in the sense of 35 USC 103 and all claims patentably distinguish thereover.

Applicants note that the Examiner cites Han et al to show a MR having a track width of not more than 0.9 μ m, contending that it would be obvious to utilize the same in the suggested combination. It is readily apparent that Han et al, which describes an inductive magnetic write head for high density magnetic recording, does not disclose the other features of the claimed invention, and the Examiner merely picks bits and pieces from the prior art to reconstruct the claimed invention. Thus, applicants submit that the proposed combination of references fail to provide the claimed features as set forth in independent claim 4 and the dependent claims thereof and all claims should be considered allowable thereover.

As to the further combination of Tagawa and Shiraishi, hereagain, the Examiner has reviewed the cited art to pick out bits and pieces therefrom to meet the claim limitations irrespective whether the cited art provides any disclosure or teaching of the other recited features of the claims. That is, whether or not Tagawa or Shiraishi et al disclose individual features, it is apparent that such references do not disclose or teach features in combination with the other recited features which enable a magnetic recording and reproducing device to operate in the manner defined. Likewise, the Examiner cited Linliu et al and Hayashi for other features and hereagain, it is apparent that the Examiner has engaged in a hindsight reconstruction attempt utilizing the principle of obvious to try, and in effect utilizing what applicant has taught against the teacher. Thus, applicants submit that the proposed combination of references fail to provide the claimed features as set forth in independent claim 4, as amended, and the dependent claims thereof, which

enable proper operation of a magnetic recording and reproducing device with a transfer rate of not less than 5 MB/s and a recording density of more than 5GB/in². As such, applicants submit that claim 4 and the dependent claims patentably distinguish over the cited art in the sense of 35 USC 103 and should be considered allowable thereover.

With respect to the newly added dependent claims, applicants submit that claims 10 - 13 recite further features which, as described in the specification of this application further enable proper operation of the magnetic recording and reading device, as claimed, which features are not disclosed or taught in the cited art such that these claims further patentably distinguish over the cited art and should be considered allowable at this time.

In view of the above amendments and remarks, applicants submit that all claims present in this application should now be in condition for allowance and issuance of an action of a favorable nature is courteously solicited.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 500.37488CC5), and please credit any excess fees to such deposit account.

Respectfully submitted,

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